

## Chapter V

### COMPARISONS WITH THE WEST POINT STUDY GROUP

#### 1. Background and Motivation

The statistical and epidemiological literature is replete with warnings against the uncritical use of the SMR and related summary measures for comparing study groups with published vital statistics for national populations or subpopulations (5), (24), (25). Those cautions are based on the adjustment difficulties described in Chapter 4, Section 2, and departures from the assumption of constant relative risk across age intervals between the study group and the external population. These drawbacks can be avoided by not referencing an external standard at all, by using one of the study groups as the standard (13), or by using as an external standard a group of military personnel, born during approximately the same years, with the same mortality follow-up, as the Ranch Hand and comparison groups.

An external group of sufficient size for meaningful statistical comparisons is not available at this time. Mortality and year of birth data are available, however, on a small group of West Point graduates, the subjects of the West Point Follow-up Study. Although this group is too small for all but very crude statistical comparisons (1), it is the only known external data available at this time. The following comparisons are, therefore, primarily descriptive.

The West Point Study Group consists of 474 members of the West Point graduation class of 1956. These men have been followed up since then for morbidity and mortality. All members of that class were, or still are, officers in the U.S. Armed Forces. The purpose of the West Point study is to investigate the relationship between blood lipid levels and cardiovascular disease. Each study subject is physically examined biennially and blood samples are obtained for lipid and lipoprotein analyses at the USAF School of Aerospace Medicine (26).

#### 2. Noncause Specific Comparisons of Ranch Hand and Comparison Subgroups with the West Point Study Group

For the purpose of these mortality comparisons, 15 of the 36 known West Point deaths occurring on or before 31 December 1982 were deleted, 9 of the 15 were killed in action, one was killed in 1959 in the line of duty and 5 were killed in automobile crashes prior to 1962. These deletions imitate the deletion of personnel killed in action from the Ranch Hand and comparison groups. Noncombat or accidental deaths prior to 1962 were deleted because death prior to 1962 would have precluded membership in the Ranch Hand or comparison groups. In addition, one West Pointer who is also a Ranch Hand, was deleted; that individual was alive on 31 December 1982.

A summary of the remaining 21 deaths among the 458 West Point subjects used in these analyses is given by year of birth in Table 34 and by age in Table 35. In Table 35 the column headed "censored" lists by age, the number of West Pointers alive on 31 December 1982.

Table 34

WEST POINT DEATHS BY YEAR OF BIRTH

<u>Year of Birth</u>	<u>At Risk</u>	<u>Dead</u>
1930	20	0
1931	59	2
1932	90	6
1933	136	8
1934	141	4
1935	12	1
	<u>458</u>	<u>21</u>

Table 35

WEST POINT DEATHS BY AGE

<u>Age</u>	<u>At Risk</u>	<u>Censored</u>	<u>Dead</u>
25-29	458	0	2
30-34	456	0	5
35-39	451	0	3
40-44	448	0	2
45-49	446	276	8
50-52	162	161	1
		<u>437</u>	<u>21</u>

In this analysis, non-Black Ranch Hand and comparison officers are compared, without regard to cause of death, with the West Point study group; all of the West Point subjects are non-Black. Non-Black Ranch Hand Officers were matched, one-to-one, by year of birth, to West Point subjects. Due to the relatively small number of Ranch Hand officers and the limited year of birth range imposed by the age of the Class of 1956, only 283 of the 458 West Point subjects received a matched Ranch Hand. Matched sets with West Pointers having the same year of birth were then merged to create six matched sets, corresponding to the six years of birth, 1930 through 35, of the West Pointers. To compare West Pointers with comparison officers, two non-Black comparison officers were matched to each West Pointer by year of birth. All West Pointers received two matched comparison individuals. Matched sets with West Pointers having the same year of birth were merged, giving six matched sets containing a total of 916 comparisons.

Logrank tests were carried out on these two matched data sets, and the results are summarized in Table 36. In these analyses, survival time is age at death. Censorship is due to survival to 31 December 1982. For those still alive on 31 December 1982, censoring time is age on that day.

Table 36

STUDY GROUP VERSUS WEST POINT GROUP  
LOGRANK COMPARISONS WITH TWO-SIDED P-VALUES

<u>Comparison</u>	<u>P-Value</u>
Ranch Hand officer versus West Point	.218
Comparison officer versus West Point	.528

An SMR analysis, with the West Pointers being the standard, is summarized in Table 37.

Table 37

SMR COMPARISON OF NON-BLACK RANCH HAND AND COMPARISON  
OFFICERS WITH THE WEST POINT STUDY GROUP

Birth Year	(SMR = .530)			(SMR = .778)			(SMR = 1)		
	<u>Ranch Hand</u>			<u>Comparison</u>			<u>West Point</u>		
	<u>At Risk</u>	<u>Dead</u>	<u>Rate</u>	<u>At Risk</u>	<u>Dead</u>	<u>Rate</u>	<u>At Risk</u>	<u>Dead</u>	<u>Rate</u>
25-31	95	2	.021	272	19	.070	79	2	.025
32	35	1	.029	164	7	.043	90	6	.067
33-34	60	1	.017	257	6	.023	277	12	.043
35-40	93	4	.043	223	5	.022	12	1	.083
		8			37			21	

The test for constant relative risk across year of birth strata gives a P-value of .229. Further, a likelihood ratio test suggests that these SMR's are not different ( $P = .392$ ).

### 3. Cause Specific Comparisons

The cause specific death counts for the West Point Study Group are given in Table 38.

Table 38  
WEST POINT MORTALITY BY CAUSE

<u>Cause</u>	<u>Count</u>
Accidents	6
Infectious disease	1
Malignant neoplasms	6
Circulatory	5
Digestive	1
Genitourinary	1
Ill defined	1
	<u>21</u>

Cause specific comparisons are carried out with three causes, cancer (malignant neoplasms), other diseases, and nondisease (accidents, suicides, homicides and ill-defined), with an adjustment for year of birth by stratification on year of birth. Relative risks are calculated using the method of Mantel and Haenszel (14). These results, based on the counts in Tables 39 and 40, are shown in Table 41.

Table 39

#### CAUSE SPECIFIC COMPARISONS RANCH HAND OFFICERS VERSUS WEST POINT

<u>Cause</u>	<u>Birth Year</u>	<u>Ranch Hand</u>		<u>West Point</u>	
		<u>At Risk</u>	<u>Dead</u>	<u>At Risk</u>	<u>Dead</u>
Nondisease	1925-1933	166	1	305	5
	1934-1940	117	4	153	1
Cancer	1925-1930	72	0	20	0
	1931	23	0	59	1
	1932	35	0	90	3
	1933	36	0	136	1
	1934	24	0	141	1
	1935-1940	93	0	12	0
Other diseases	1925-1934	190	2	446	8
	1935-1940	93	1	12	1

Table 40

CAUSE SPECIFIC COMPARISON  
COMPARISON OFFICERS VERSUS WEST POINT

<u>Cause</u>	<u>Birth Year</u>	<u>Comparisons</u>		<u>West Point</u>	
		<u>Number</u>	<u>Dead</u>	<u>Number</u>	<u>Dead</u>
Nondisease	1929-1931	272	11	79	1
	1932	164	2	90	2
	1933	148	1	136	2
	1934-1937	332	2	153	1
Cancer	1929-1931	272	2	79	1
	1932	164	2	90	3
	1933	148	1	136	1
	1934-1937	332	2	153	1
Other diseases	1929-1932	436	9	169	1
	1933	148	1	136	5
	1934	109	1	141	2
	1935-1937	223	3	12	1

Table 41

CAUSE SPECIFIC RELATIVE RISKS, P-VALUES  
95% CONFIDENCE INTERVALS FOR LOG RELATIVE RISK

<u>Cause</u>	<u>Comparison</u>	<u>RR</u>	<u>95% Conf Interval for Log Rel Risk</u>	<u>P-value</u>	<u>Power</u>
Nondisease	RH vs WP	1.072	(-1.504 - 1.643)	.931	.051
	Comp vs WP	0.841	(-1.354 - 1.009)	.775	.059
Cancer	RH vs WP				
	Comp vs WP	0.690	(-1.634 - .891)	.564	.089
Other diseases	RH vs WP	0.474	(-3.540 - 2.047)	.600	.082
	Comp vs WP	0.779	(-2.367 - 1.867)	.817	.056
All causes	RH vs WP	0.539	(-2.191 - .954)	.441	.120
	Comp vs WP	0.728	(-1.940 - .306)	.702	.067

While the Ranch Hand versus West Point cancer comparison cannot be assessed using the Mantel-Haenszel procedure, the absence of Ranch Hand cancer deaths in this analysis is of interest. This finding is consistent with the apparent but nonsignificantly decreased Ranch Hand cancer mortality noted in the Ranch Hand versus matched comparison group analysis (Chapter III).